What is claimed is:

1. A reprogrammable metal-to-metal antifuse comprising:

a lower Ti barrier layer;

a lower adhesion-promoting layer disposed over said lower Ti barrier layer;

an antifuse material layer disposed above an upper surface of said lower adhesion-promoting layer lower Ti barrier layer, said antifuse material layer selected from a group comprising at least one of amorphous carbon and amorphous carbon doped with at least one of hydrogen and fluorine disposed over said lower adhesion-promoting layer;

an upper adhesion-promoting layer disposed over said antifuse material layer; and

an upper Ti barrier layer disposed over said upper adhesion-promoting layer.

2. The reprogrammable metal-to-metal antifuse of claim 1, wherein said lower adhesion-promoting layer and said upper adhesion-promoting layer each have a thickness of between about 2 angstroms and about 20 angstroms.

3. The reprogrammable metal-to-metal antifuse of claim 1, wherein said lower adhesion-promoting layer and said upper adhesion-promoting layer are comprised of a material selected from the group comprising Si_xC_y and Si_xN_y.

4. The reprogrammable metal-to-metal antifuse of claim 3, wherein said lower adhesion-promoting layer and said upper adhesion-promoting layer comprise Si_xC_y.

5. The reprogrammable metal-to-metal antifuse of claim 4, wherein a ratio of x to y in said Si_xC_y is in a range of about 1 +/- 0.4.

6. The reprogrammable metal-to-metal antifuse of claim 3, wherein said lower adhesion-promoting layer and said upper adhesion-promoting layer comprise Si_xN_y.

7. The reprogrammable metal-to-metal antifuse of claim 6, wherein a ratio of x to y in said Si_xN_y is in a range of about .75 +/- 0.225.

8. The reprogrammable metal-to-metal antifuse of claim 2, wherein said lower adhesion-promoting layer and said upper adhesion-promoting layer are from a material selected from the group comprising Si_xC_y and Si_xN_y.

9. The reprogrammable metal-to-metal antifuse of claim 8, wherein said lower adhesion-promoting layer and said upper adhesion-promoting layer comprise Si_xC_y.

10. The reprogrammable metal-to-metal antifuse of claim 9, wherein a ratio of x to y in said Si_xC_y is in a range of about 1 +/- 0.4.

11. The reprogrammable metal-to-metal antifuse of claim 8, wherein said lower adhesion-promoting layer and said upper adhesion-promoting layer comprise Si_xN_y.

12. The reprogrammable metal-to-metal antifuse of claim 8, wherein a ratio of x to y in said Si_xN_y is in a range of about .75 +/- 0.225.

13. The reprogrammable metal-to-metal antifuse of claim 1, wherein said antifuse material layer is formed from amorphous carbon having a thickness of between about 50 angstroms and about 500 angstroms.

14. The reprogrammable metal-to-metal antifuse of claim 1, wherein said antifuse material layer comprises amorphous carbon doped with hydrogen in a concentration range of about 1 atomic percent to about 40 atomic percent.

15. The reprogrammable metal-to-metal antifuse of claim 14, wherein said antifuse material layer has a thickness of between about 50 angstroms and about 500 angstroms.

16. The reprogrammable metal-to-metal antifuse of claim 1, wherein said antifuse material layer is about 50 angstroms to 500 angstroms in thickness, and said

lower adhesion-promoting layer and said upper adhesion-promoting layer each have a thickness of between about 2 angstroms and about 20 angstroms.

17. The reprogrammable metal-to-metal antifuse in claim 16, wherein said lower adhesion-promoting layer and said upper adhesion-promoting layer are from a material selected from the group comprising Si_xC_y and Si_xN_y.

18. The reprogrammable metal-to-metal antifuse of claim 17, wherein said lower adhesion-promoting layer and said upper adhesion-promoting layer comprise Si_xC_y.

19. The reprogrammable metal-to-metal antifuse of claim 18, wherein a ratio of x to y in said Si_xC_y is in a range of about 1 +/- 0.4.

20. The reprogrammable metal-to-metal antifuse of claim 17, wherein said lower adhesion-promoting layer and said upper adhesion-promoting layer comprise Si_xN_y.

21. The reprogrammable metal-to-metal antifuse of claim 20, wherein a ratio of x to y in said Si_xN_y is in a range of about .75 +/- 0.225.

22. The reprogrammable metal-to-metal antifuse of claim 17, wherein said amorphous carbon antifuse material layer is doped with hydrogen from about 1 atomic percent to about 40 atomic percent.

23. A reprogrammable metal-to-metal antifuse comprising:

a lower metal interconnect layer;

an inter-metal dielectric layer disposed over said lower metal interconnect layer, said inter-metal dielectric layer having a via formed therethrough and filled with a metal plug;

a lower Ti barrier layer disposed over said metal plug;

a lower adhesion-promoting layer disposed over said lower Ti barrier layer;

an antifuse material layer formed from amorphous carbon and disposed over said lower adhesion-promoting layer;

an upper adhesion-promoting layer disposed over said antifuse material layer;

an upper Ti barrier layer disposed over said upper adhesion-promoting layer; and

an upper metal interconnect layer disposed over said upper Ti barrier layer.

24. The reprogrammable metal-to-metal antifuse of claim 23, wherein said lower adhesion-promoting layer and said upper adhesion-promoting layer are comprised of a material selected from the group comprising Si_xC_y and Si_xN_y.

25. The reprogrammable metal-to-metal antifuse of claim 24, wherein said lower adhesion-promoting layer and said upper adhesion-promoting layer comprise Si_xC_y.

26. The reprogrammable metal-to-metal antifuse of claim 25, wherein a ratio of x to y in said Si_xC_y is in a range of about 1 +/- 0.4.

27. The reprogrammable metal-to-metal antifuse of claim 24, wherein said lower adhesion-promoting layer and said upper adhesion-promoting layer comprise Si_xN_y.

28. The reprogrammable metal-to-metal antifuse of claim 27, wherein a ratio of x to y in said Si_xN_y is in a range of about .75 +/- 0.225.

29. The reprogrammable metal-to-metal antifuse of claim 23, wherein said antifuse material layer has a thickness of between about 50 angstroms and about 500 angstroms.

30. The reprogrammable metal-to-metal antifuse of claim 23, wherein said amorphous carbon antifuse material layer is doped with hydrogen in a concentration range of about 1 atomic percent to about 40 atomic percent.

31. The reprogrammable metal-to-metal antifuse of claim 30, wherein said amorphous carbon antifuse material layer has a thickness of between about 50 angstroms and about 500 angstroms.

32. The reprogrammable metal-to-metal antifuse of claim 23, wherein said lower adhesion-promoting layer and said upper adhesion-promoting layer are comprised of a material selected from the group comprising Si_xC_y, Si_xN_y, $Si_xC_yN_z$, $Si_xO_yC_z$, and $Si_xO_yN_z$.

33. A reprogrammable metal-to-metal antifuse comprising:

a lower Ti barrier layer;

a lower Si_xC_y layer disposed over said lower Ti barrier layer;

an antifuse material layer comprised of amorphous carbon and disposed over said lower Si_xC_y layer;

an upper Si_xC_y layer disposed over said antifuse material layer; and

an upper Ti barrier layer.

34. A reprogrammable metal-to-metal antifuse comprising:

a lower Ti barrier layer;

a lower Si_xN_y layer disposed over said lower Ti barrier layer;

an antifuse material layer comprised of amorphous carbon and disposed over said lower Si_xN_y layer;

an upper Si_xN_y layer disposed over said antifuse material layer; and

an upper Ti barrier layer.

35. A method for fabricating a reprogrammable metal-to-metal antifuse, comprising:

planarizing an insulating layer and a tungsten plug;

forming a lower Ti barrier layer over said insulating layer and said tungsten plug;

forming a lower adhesion-promoting layer over said lower Ti barrier layer, said lower adhesion-promoting layer selected from the group comprising Si_xC_y and Si_xN_y;

forming an antifuse material layer over said lower adhesion-promoting layer, wherein said antifuse material layer is selected from the group comprising amorphous carbon, amorphous carbon doped with at least one of hydrogen and fluorine, and amorphous silicon carbide;

forming an upper adhesion-promoting layer over said antifuse material layer, said upper adhesion-promoting layer selected from the group comprising Si_xC_y and Si_xN_y;

forming an upper Ti barrier metal layer over said antifuse material layer;

forming an oxide or tungsten hardmask layer over said barrier metal layer;

forming a layer of photoresist over said hardmask layer;

defining said hardmask layer;

removing said photoresist;

defining a shape of a stack for said antifuse by etching said upper Ti barrier layer, said upper adhesion-promoting layer, said antifuse material layer, said lower adhesion-promoting layer, and said lower Ti barrier metal layer using said hardmask layer as a mask;

forming an insulating layer over said stack;

forming an aperture in said insulating layer;

forming a metal interconnect layer over said insulating layer and in said aperture;

forming a second masking layer over said metal interconnect layer; and defining said metal interconnect layer.

36. The method of Claim 35, wherein said forming said antifuse material layer comprises forming said antifuse material layer to a thickness of from about 10 nm to about 80 nm.

37. The method of Claim 35, wherein said forming said Ti barrier metal layer comprises forming said Ti barrier metal layer to a thickness of from about 25 nm to about 200 nm.

38. The method of Claim 35, wherein said lower and upper adhesion-promoting layers are essentially monolayers.

39. The method of Claim 35, wherein said forming an antifuse material layer comprises depositing said antifuse layer from an acetylene source gas.

40. A method for programming and erasing a reprogrammable metal-to-metal antifuse, comprising:

programming said antifuse by applying a programming potential across said antifuse to cause a programming current to flow through said antifuse until its resistance substantially decreases; and

erasing said antifuse by applying an erasing potential across said antifuse, said erasing potential being lower in magnitude than said programming potential and causing an erase current to flow through said antifuse.

41. The method of claim 40 wherein applying a programming potential across said antifuse and applying an erasing potential across said antifuse both comprise applying a potential having a more negative value above said antifuse material layer.

42. The method of claim 40 wherein said programming current is in a range of between about 100μA to about 1mA.

43. The method of claim 40 wherein programming said antifuse also includes soaking said antifuse by passing a soak-current through said antifuse.

44. The method of claim 43 wherein said soak-current has a magnitude of about 5mA.

45. The method of claim 42 wherein said programming current is less than about 1mA and a ratio of said erase current to said programming current is about 10:1.

46. The method of claim 40 wherein:

said programming current is less than about 1mA;

programming said antifuse also includes soaking said antifuse by passing a soak-current having a magnitude of less than about 5mA; and

a ratio of said erase current to said soak current is about 3:1.